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708 BLOSSOM HILL RD., #201			PHAM, KHANH B	
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/605,154
Filing Date: September 11, 2003
Appellant(s): WISS ET AL.

MAILED

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Technology Center 2100

John A. Smart
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed July 26, 2007 appealing from the Office action mailed August 23, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

Art Unit: 2166

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,615,223 B1

SHIH et al.

9-2003

Riedel ("When Local Becomes Global: An Application Study of Data Consistency in a Network World", 2001).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1-8, 10-23, 25-32, 34-43** are rejected under 35 U.S.C. 102(e) as being anticipated by Shih et al. (US 6,615,223 B1), hereinafter "Shih".

As per claims 1, 16-17, Shih teaches a method and computer readable medium for replicating a transaction from a primary database to a replicate database while the replicate database remains available for use (Col. 9 lines 15-42), the method comprising:

- "recording information about a transaction being performed at a primary database in a transaction log" at Col. 9 lines 15-25 and Fig. 3;
- "synchronously copying the information about the transaction in the transaction log to a mirrored transaction log, so as to create at the replicate database an exact copy of the transaction log" at Col. 9 line 28 to Col. 10 line 8 and Fig. 3;
- "generating a reconstructed transaction based on the information about the transaction copied to the mirrored transaction log" at Col. 10 lines 10-45;
- "applying the reconstructed transaction at the replicate database while the replicate database remains available for use" at Col. 9 lines 28-42.

As per claim 2, Shih teaches the method of claim 1, wherein "said transaction includes a selected one of a Structured Query Language 'INSERT', 'UPDATE', 'DELETE', 'DDL', AND 'Procedure' operation" at Col. 10 lines 20-40.

As per claim 3, Shih teaches the method of claim 1, wherein "said recording step includes recording at least one log record about the transaction in the transaction log" at Col. 9 lines 15-25.

As per claim 4, Shih teaches the method of claim 3, wherein "said at least one log record characterizes changes made to the primary database in the transaction" at Col. 9 lines 15-25

As per claim 5, Shih teaches the method of claim 1, wherein "said synchronously copying step includes using a file mirroring module" at Fig. 1, element 40.

As per claim 6, Shih teaches the method of claim 1, wherein "said synchronously copying step includes using file replication hardware" at Fig. 3, elements 316, 320.

As per claim 7, Shih teaches the method of claim 1, wherein "said synchronously copying step includes using file replication software" at Col. 9 lines 42-44.

As per claim 8, Shih teaches the method of claim 1, wherein "said synchronously copying step includes synchronously copying information to the transaction log and the mirrored transaction log before completing the transaction at the primary database" at Col. 1 lines 25-35.

As per claim 10, Shih teaches the method of claim 1, further comprising:
“copying database schema information from the primary database to a site at which the mirrored transaction log is located to enable transactions to be reconstructed and applied at the replicate database” at Col. 1 lines 53-65.

As per claim 11, Shih teaches the method of claim 10, wherein “said generating step includes generating the reconstructed transaction based, at least in part, on said database schema information” at Col. 10 lines 9-45.

As per claim 12, Shih teaches the method of claim 1, wherein “said generating step includes formatting the reconstructed transaction so that the reconstructed transaction is in the same format as the transaction at the primary database” at Col. 10 lines 20-40.

As per claim 13, Shih teaches the method of claim 1, wherein “said applying step includes verifying that the transaction ordering is correct” at Col. 22 line 55 to Col. 23 line 3.

As per claim 14, Shih teaches the method of claim 1, wherein “said applying step includes applying the reconstructed transaction at the replicate database in the same order as the transaction order at the primary database” at Col. 14 lines 13-23.

As per claim 15, Shih teaches the method of claim 14, further comprising:
“responding to a database query at the replicate database while a transaction is being replicated from the primary database to the replicate database” at Col. 9 lines 30-40.

Claims 18-23, 25-32, 36, 39-43 recite a method and a system for performing similar method as in claims 1-15 discussed above and therefore rejected by the same reasons.

As per claim 37, Shih teaches the method of claim 35, further comprising:

- “tracking modifications to said database schema information at the first database” at Col. 9 lines 28-41;
- “constructing a replicate operation based on said database schema information in effect when the operation is performed at the first database” at Col. 8 lines 55-67.

As per claim 38, Shih teaches the method of claim 30, further comprising:

- “assigning a unique identifier to database objects at the first database” at Col. 12 lines 50-67;
- “if a database object is modified, assigning a different unique identifier to the database object that is modified” at Col. 12 lines 50-67;
- “determining a particular database object to be used in constructing a replicate operation based upon said unique identifier assigned to said particular database object” at Col. 10 lines 10-40.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 9, 24 and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shih** as applied to claims 1-8, 10-23, 25-32, 34-43 above, and in view of Riedel et al. ("When Local Becomes Global: An Application Study of Data Consistency in a Network World"), hereinafter "**Riedel**"

As per claims 9, 24, 33, Shih teaches the method and system of claim 1, 18, 30 discussed above. Shih teaches the step of synchronously copying the information about the transaction log to the mirrored transaction log at Col. 9 lines 28-60, but does not explicitly teach: "said synchronously copying step includes replicating at a file block level" as claimed. However, Riedel discussed at page 268, section 2.4 the advantage of replicating at file block level versus file level. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Riedel with Shih's teaching as suggested by Riedel because "a successful system for global data placement should operate at the lowest-level of these interfaces in order to provide the maximum compatibility with existing applications" (Riedel, page 268).

(10) Response to Argument

A. Claims 1-8, 10-23, and 34-43 are rejected under Section 102.

Regarding the 35 U.S.C 102(e) rejection to claims 1, 16, and 17, appellant argued that Shih's system does not have an exact copy (mirror image) of the log at replicate sites. The examiner respectfully disagrees.

First, it is noted that the phrase "exact copy" was added to original claims in the Amendment filed May 03, 2006, and the Specification does not contain this phrase. The phrase "exact copy" is therefore interpreted by the Examiner as "mirror image", or "copy of the transaction log" created by "synchronously copy the information about the transaction in the transaction log to a mirrored transaction log", as recited in claim 1. Appellant's recitation of the Examiner's rejection in page 7-8 of the Appeal Brief does not reflect the correct copy of the Final Rejection, the amended limitation "so as to

create at the replicate database an exact copy of the transaction log” was omitted. See section 9 above for completed rejection of claims 1, 16-17.

Second, Shih teaches at Fig. 3 and Col. 9 line 28 to Col. 10 line 8 the process of copying entries from change log 314 to change log 324 as follows:

- a) Change log entries from change log 314 are copied to a replication log 316 using either asynchronous or synchronous replication. (Col. 9 lines 42-54)
- b) The change log information copied to the replication log 316 is propagated¹ to the replication log 320 at remote site 304. (Col. 9 lines 55-57)
- c) At the remote site 304, the change log entry in replication log 320 can be copied to change log 322 asynchronously or synchronously. (Col. 9 line 61 to Col. 10 line 8).

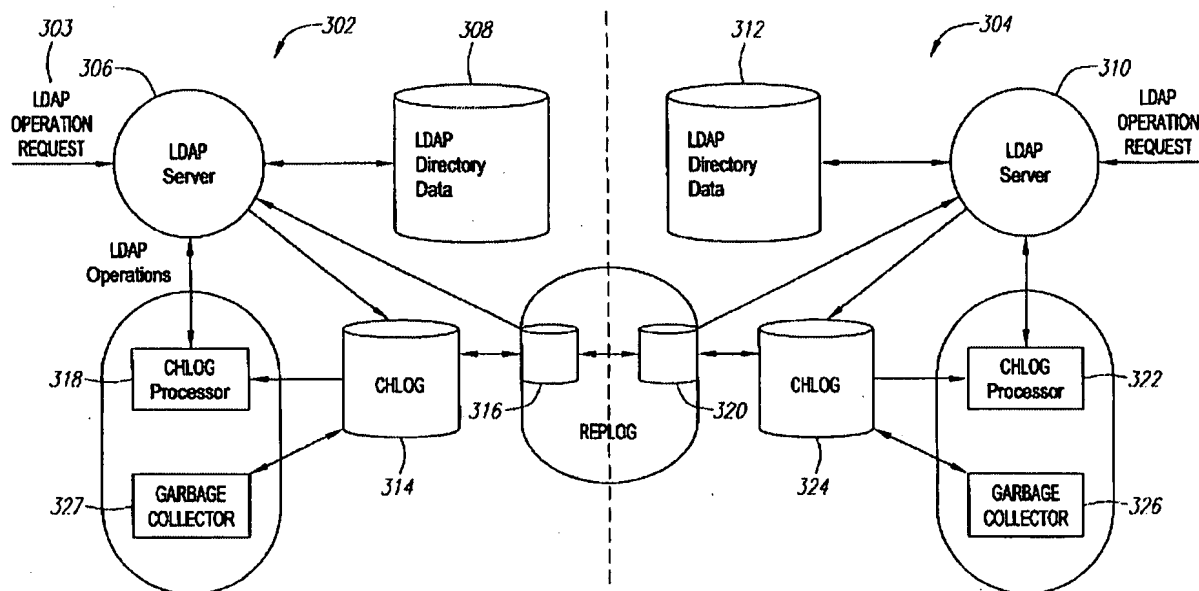


FIG. 3

¹ Shih teaches at Col. 9 lines 55-60, the mechanism used to replicate information between 316 and 320 is the Advance Symmetric Replication, which is similar to the mechanism used by Appellant's invention (i.e. "Symmetrix Remote Data Facility" from EMC Corporation or SnapMirror from Network Appliance).

As seen from the steps above, log entries from the change logs is copied from one to another without any modification. The change log **324** at the remote site 304 therefore contains exact copy, or mirror image of the change log **314** at the LDAP site 302.

Appellant cited several portions of the Shih reference to show that Shih's system requires translation of the change instructions before storing in the transaction log. However, these text portions are not relevant to the issue because they are performed before the step of creating exact copy of the transaction log.

Appellant further discussed at pages 10-11 that Appellant's claimed invention is significant different from Shih's system because in Appellant's invention, "mirror copies are created using block-level operations", therefore "one may create a replicate that is a byte-for-byte, block-for block exact (physically identical) copy of the primary". It is noted that the features upon which applicant relies (i.e., "block-level", "byte-for-byte", "block-for-block") are not recited in the rejected claims 1, 16-17. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, Appellant improperly defined the term "exact" to be "physical identical", while the specification does not provide support for the term.

B. Claims 9, 24 and 33 are rejected under 35 U.S.C 103(a) as being unpatentable over Shih in view of Riedel.

Regarding the 35 U.S.C 103(a) rejection to claims 9, 24 and 33, Appellant argued that Shih and Riedel, as combined, does not teach or suggest Appellant's claim limitation that require the creation of an exact copy or mirror image of the transaction log at the replication database. However, in view of the discussion regarding the 102 rejection above, Shih teaches all limitations of claims 1, 16-17, and therefore, the combination of Shih and Riedel teaches all limitations of dependent claims 9, 24 and 33.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Shih teaches the step of synchronously copying the information about the transaction log to the mirrored transaction log at Col. 9 lines 28-60, but does not explicitly teach: "said synchronously copying step includes replicating at a file block level" as claimed. However, Riedel discussed at page 268, section 2.4 the advantage of replicating at file block level versus file level. Particularly, Riedel teaches that:

"in most system today, there is already a common interface to storage - applications are written against file open close, read, write interface at the file system level, which translates into a set of lower-level block request"

"At the **block level**, **remote mirroring** across disk arrays connected by a wide-area link provides **replication** of all write operations by applications at a **primary node** to a **second backup node**"

and

"We believe that a **successful system** for global data placement **should operate at the lowest level** of these interfaces **in order to provide the maximum compatibility** with existing application"

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Riedel with Shih's teaching as suggested by Riedel because "a successful system for global data placement should operate at the lowest-level of these interfaces in order to provide the maximum compatibility with existing applications" (Riedel, page 268).

In light of the foregoing arguments, the 35 U.S.C 102 and 103 rejections are hereby sustained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Khanh B. Pham

Primary Examiner

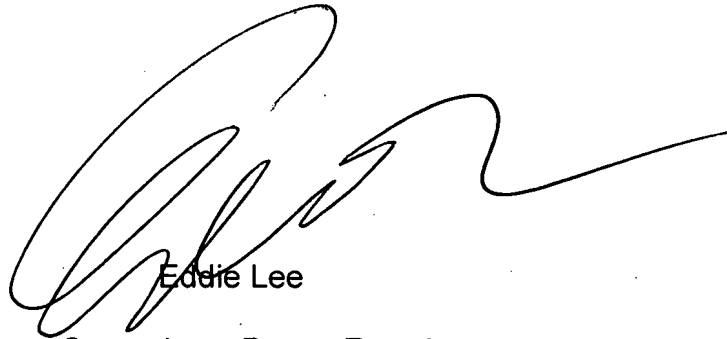


10/26/2007

Conferees:

Hosain Alam

Supervisory Patent Examiner



Eddie Lee

Supervisory Patent Examiner

EDDIE C. LEE
SUPERVISORY PATENT EXAMINER